

# CBO PAPER

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THE ONE-COURTROOM,  
ONE-JUDGE POLICY:  
A PRELIMINARY REVIEW

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The Congressional Budget Office (CBO) prepared this analysis for the Subcommittee on Economic Development, Public Buildings, Hazardous Materials and Pipeline Transportation of the House Committee on Transportation and Infrastructure. The paper reviews the potential effect on trial delays of courtroom sharing by federal judges.

Avi Ebenstein and R. Mark Musell of CBO prepared the paper under the supervision of Arlene Holen. Charles Capone helped develop the statistical model used in the analysis, and Perry C. Beider, John Righter, Rachel Schmidt, and Jennifer L. Smith, also of CBO, provided useful comments. The authors also appreciate the assistance of David Maggi at the Department of Commerce, Timothy J. Muris, Marsha Swiss, and staff at the General Accounting Office and at the Office of Management and Budget.

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## **CONTENTS**

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SUMMARY AND INTRODUCTION	1
The Issue	1
General Analytic Method	3
Limitations of the Analysis	5
SIMULATING A COURT SYSTEM	8
SIMULATING COURTROOM SHARING	10
APPENDIX: AN EXPLANATION OF CBO'S MODEL	13

## **TABLES**

1.     The Impact of Increased Courtroom Sharing Assuming Different Numbers of Courtrooms	11
2.     The Impact of Increased Courtroom Sharing Assuming Different Numbers of Trials	12

## SUMMARY AND INTRODUCTION

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Businesses, the military, government agencies, and nonprofit organizations frequently use mathematical techniques to improve their understanding of the operation of complex systems and to help ensure the efficient use of resources. This Congressional Budget Office (CBO) analysis applies one such technique to simulate the flow of trials through a federal court system and to assess the impact on trial delays of providing less than one courtroom per judge. The analysis is based on data collected by the General Accounting Office (GAO); it indicates that the sharing of courtrooms by judges should not cause major trial delays, as some have suggested. More specifically, most examples examined by CBO illustrate that courtroom sharing would not cause delays for more than 95 percent of trials and that for those few that were delayed, the waiting time would generally average less than half a day. CBO's analysis has important limitations, however, and firmer conclusions would require further research.

### The Issue

The Administrative Office of the U.S. Courts (AOUSC) has a sophisticated system for planning courthouse construction that incorporates projected caseloads and staffing levels. (The AOUSC administers district and other federal courts.) The system has been reviewed several times, and not always favorably. A 1993 report by

GAO criticized the process as arbitrary, inconsistent, and unreliable.<sup>1</sup> The AOUSC changed some procedures in response to that report and, according to GAO, has now improved the process throughout the districts, making it more consistent. However, one issue not fully addressed is the common practice of assigning each federal district judge his or her own courtroom.<sup>2</sup> GAO suggests that the one-courtroom, one-judge policy may result in excess court space. The Administration has also focused on the issue: the President's budget for fiscal year 2001 urges the judiciary to adopt courtroom sharing in planning courthouse construction.

In analyzing courtroom use in seven cities, GAO found that in 1995, on average, courtrooms were in use only 54 percent of the available workdays.<sup>3</sup> The analysis noted a connection between the low rate of courtroom use and the practice of assigning a separate courtroom for the exclusive use of each judge. Requiring judges to share courtrooms could reduce the need for new construction. (Sharing courtrooms in this analysis means that different judges may preside at different times in the same courtroom.) The Office of Management and Budget currently estimates

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1. General Accounting Office, *Federal Judiciary Space: Long-Range Planning Process Needs Revision*, GAO/GGD-93-132 (September 28, 1993).
  2. Each state has at least one district court, which is the trial court of general federal jurisdiction. The 50 states have 89 district courts, and the District of Columbia and the Commonwealth of Puerto Rico each have one. Some courts, including those in New Mexico, already share courtrooms. Sharing also occurs, in some areas, among semiretired judges, who continue to preside at some trials and are referred to as senior judges.
  3. General Accounting Office, *Courthouse Construction: Better Courtroom Use Data Could Enhance Facility Planning and Decisionmaking*, GAO/GGD-97-39 (May 19, 1997).

that the average cost of a new courtroom, including adjacent office and other space, is \$1.5 million.

The AOUSC makes several points in response to GAO's concerns about courtroom use. It argues that one problem with requiring judges to share courtrooms is that the practice could lead to fewer available courtrooms and consequently might increase caseloads and trial delays. According to that argument, having courtrooms available makes the prospect of going to trial more concrete for litigants and frequently induces parties to settle out of court. In addition, the AOUSC notes, many courtrooms that GAO found empty may not have been available for other uses because many cases settle just before trial, leaving little opportunity to reschedule courtrooms.

This paper analyzes how courtroom sharing by judges might affect courtroom use and trial delays.

#### General Analytic Method

Courts, like other organizations, often face decisions about the amount of capacity to provide to meet the demand for services. Providing too much capacity leads to extra costs—for example, idle employees and equipment. Providing too little can

lead to long waits and, in turn, to such problems as dissatisfied clients and lost business.

Organizations use a variety of techniques to help guide decisions about the amount of capacity to put in place. One technique is dynamic simulation modeling, in which the flow of activity through a system—for example, the flow of customers through a post office—is simulated on a computer. Such models, referred to as queuing (or waiting-time) models, incorporate assumptions about the rate of flow into the system, the amount of time spent in each part of the system, and the resources on hand to deal with the flow. By varying those assumptions, analysts can test how changes in operations affect a system’s performance.

CBO's analysis used a queuing model to simulate the flow of trials through a court system (see the appendix for more details on the model). Analysts gave the model various assumptions about the key elements of a court system—including the number of trials per day, the distribution of the duration of trials, and the number of courtrooms—and the model then described the performance of the system. That performance was measured in terms of the percentage of days a courtroom is used, the percentage of trials delayed, and the average delay (measured as the number of days a trial is postponed). By varying the model’s basic assumptions, CBO tested the effect of courtroom sharing on the performance of the simulated court system.

CBO used GAO's 1995 data for the 10 courtrooms of the district court facility in Denver, Colorado, to derive the number and length of trials used in the model.<sup>4</sup> All delays were assumed to be caused by the lack of a courtroom. Delays were measured from the time a trial was expected to begin had the courtroom been available. CBO ran several different simulations, each of which is described later in this paper.

#### Limitations of the Analysis

Simulations such as the ones described here cannot by themselves answer fundamental questions about the need for court space. They focus solely on the narrow question of courtroom sharing. Many other considerations, such as the number and complexity of trials, enter into planning court space for the judiciary. And even with regard to courtroom sharing, the analysis addresses only the possible consequences that sharing has on trial delays. Other effects are not considered—for example, a possible decline in the morale of judges, who often think of courtrooms as personal work spaces, or the security concerns that may arise as criminal defendants are moved around in courthouses. A further limitation is that the analysis does not compare costs and benefits. (If it did, it would have to estimate costs

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4. CBO's information indicates that for most of 1995, Denver had 10 judges, including three visiting jurists. An 11th judge was appointed in September. District court systems in the United States have from two to more than 40 judges. CBO estimates that about 40 percent of the courts have 10 or more judges, including senior judges.

associated with courtrooms and their construction as well as costs of any extra delays associated with courtroom sharing—for example, costs of justice delayed or of additional time required from expert witnesses.)

The simulations by themselves only suggest that in some situations, courtroom sharing would not cause major trial delays. They do not prove that, because like any simulation, the ones used in this analysis could not take into account all of the relevant factors that affect trial delays and the use of courtrooms.

Modeling a highly complex system, like a court, is difficult, and CBO's model does not fully capture many of the variables that influence how courts are used. Among other things, the simulations could not take account of the conditions particular to courts of varying sizes and in different locations (variations from area to area in court rules and legal cultures, for example). Accordingly, the model's results cannot be assumed to apply equally to all courts. Moreover, trials place widely varying demands on resources depending on the type of trial (for instance, civil or criminal, jury or nonjury) and its circumstances and complexity. The simulations presented here are based on a pattern of trials observed in one district court system, Denver's, during a single year, 1995. That pattern may not be typical, but there is also no evidence that it is not. Future analyses could consider other court districts and distinguish between types of trials.

The analysis has other limitations as well. The model does not account for design and architectural variations in courtrooms, in effect assuming that trials could be assigned to courtrooms without restriction. But those variations could limit some sharing. (For example, it would not always be possible to hold criminal trials in courtrooms designed without cells for criminal defendants.) The model also assumes that the scheduling apparatus necessary to ensure efficient courtroom sharing would be in place. In practice, that kind of centralized process may be more or less efficient than current scheduling.

The simulations do, however, improve on earlier efforts in several respects.<sup>5</sup> Among other things, they incorporate data on actual trials and take trial-related activities—for example, pretrial conferences, hearings on motions, and sentencing—into account. They also add a large margin of extra time to the length of the trials in recognition of the many variables that the model did not account for. (As explained in more detail later, that extra time comes from counting a courtroom used for any part of a day as occupied for the entire day.) After incorporating those adjustments, CBO's simulations indicate that courtroom sharing should not be dismissed out of hand because of concerns about delays. They also suggest that

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5. For a review of earlier work on courtroom sharing, see Terence Dunworth and James S. Kakalik, *Research on Courtroom Sharing*, Project Memorandum PM-598-1-ICJ (Santa Monica, Calif.: RAND, September 1996).

additional analysis is warranted and illustrate one among several possible analytic methods for conducting a more comprehensive review.<sup>6</sup>

### SIMULATING A COURT SYSTEM

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As a first step, CBO adapted a mathematical model to simulate a court system patterned after Denver's in 1995. (That model then served as the baseline for measuring the impact of more courtroom sharing.) Using GAO's 1995 data on Denver trials, CBO's simulation produced a utilization rate of 52.75 percent, which is virtually identical to GAO's results. The utilization rate in that base-case simulation is the average for 100 runs of the simulation. For those runs, delays occurred, on average, in only one-half of one percent of all trials and averaged well under half a day in length. Thus, essentially, no trials were delayed in the base-case simulations.

The analysis made several critical assumptions as inputs to the statistical model. First, it assumed that a new trial started in one of the 10 courtrooms in Denver's U.S. courthouse, on average, every 1.02 days.<sup>7</sup> In developing a specific distribution of

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6. One such review is currently in progress; the AOUSC has hired Ernst and Young to study the federal system for planning courtroom construction. That study is planned for release this year.
  7. That figure is simply the number of workdays in the year (250) divided by the number of trials in 1995 (245). CBO based its estimate of the number of trials on the best data available, which were consistent with information from the AOUSC and GAO.

trial starting times around the average to use in the simulations, CBO took the actual distribution of times from GAO's data. Those data showed one new trial beginning on most days in 1995. Only rarely did several trials start on the same day.

Second, the analysis assumed that an average trial lasted 5.41 days. CBO arrived at that duration by dividing the number of days courtrooms were occupied in 1995 (according to GAO's data) by the number of trials. The data show that most trials lasted a few days but some took up to two weeks, and the statistical distribution of trial lengths around the average that CBO chose for its model followed that pattern. Data on trial lengths included the time that courtrooms were used for trial-related activities. Under GAO's approach, the duration of a trial was also measured in such a way that a courtroom used for any part of a day was assumed to be used for the entire day. (For example, GAO's data reported a courtroom occupied with a trial for a single hour on two consecutive days as occupied with that trial for two full days.) The additional time incorporated in trial lengths imparts a conservative bias to the model's results—which means that the model probably overstates the impact of courtroom sharing on trial delays. The extra time is significant. To illustrate, consider that the utilization rate of almost 53 percent that GAO computed for Denver in 1995 incorporates that extra time. However, CBO's computations show that courtrooms were actually occupied—excluding the extra margin—for only 20 percent of the available time.

Third, the analysis assumed that trials could begin and end at any time during a workday. In reality, scheduling trials one after another in the same room may be difficult. However, the margin of extra time added to trial lengths helps take such scheduling problems into account.<sup>8</sup>

#### SIMULATING COURTROOM SHARING

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To simulate the effect of courtroom sharing, CBO took the base-case model and ran several simulations that varied the assumptions about the number of courtrooms in Denver and the number of trials in 1995. The simulations all incorporated the basic assumptions about trial lengths described above. The analysis found that in most instances, courtroom sharing in Denver would delay less than 5 percent of all trials.

In one of the approaches that CBO used, analysts ran the simulation using an assumption of fewer than 10 courtrooms while holding the number of trials and the number of judges at their 1995 level. (That approach simulates courtroom sharing because the model assigns more cases, and consequently more judges, to each courtroom.) First, CBO simulated the consequences of nine rather than 10 courtrooms, which represents a modest amount of courtroom sharing. Under the

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8. To account for scheduling problems, CBO ran several simulations that added a half-day margin to trial lengths in addition to the margin already included in GAO's data. The simulations did not change the basic conclusion that courtroom sharing would not necessarily increase trial delays.

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TABLE 1. THE IMPACT OF INCREASED COURTROOM SHARING ASSUMING DIFFERENT NUMBERS OF COURTROOMS

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Current Ten-Courtroom System	Assumed Alternate Number of Courtrooms		
	Nine	Eight	Seven
Percentage of Days Courtroom Used	52.75	58.79	65.74
Percentage of Trials Delayed	0	2.26	7.36
Average Number of Days Trials Delayed	0	0.52	0.56

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SOURCE: Congressional Budget Office based on data provided by the General Accounting Office.

NOTE: Percentages are averages over many simulations. Delays are averages per trial postponed.

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nine-courtroom assumption, the rate of utilization would rise from 52.75 percent of available workdays (10 courtrooms) to 58.79 percent of available days (nine courtrooms) (see Table 1). According to the simulation, the percentage of trials that were delayed would rise from the estimated current level of almost none to 2.26 percent, and the average delay for those trials would be about half a day. If the model assumed eight courtrooms, utilization would increase to 65.74 percent of available workdays, and the percentage of trials delayed would rise to just over 7.36 percent, with delays averaging just over half a day. If the number of courtrooms dropped to seven, 23 percent of trials would be delayed by less than a full day, on average.

Another approach to modeling courtroom sharing assumes a greater number of trials but the same number of courtrooms and trials per judge. Under those assumptions, which imply the availability of more judges to handle the increased

TABLE 2. THE IMPACT OF INCREASED COURTROOM SHARING ASSUMING DIFFERENT NUMBERS OF TRIALS

Current Caseload	Assumed Percentage Increase in Caseload		
	10	15	25
Percentage of Days Courtroom Used	52.75	57.90	61.00
Percentage of Trials Delayed	0	1.40	2.10
Average Number of Days Trials Delayed	0	0.48	0.45
			63.45
			3.96
			0.51

SOURCE: Congressional Budget Office based on data provided by the General Accounting Office.

NOTE: Percentages are averages over many simulations. Delays are averages per trial postponed.

caseload, the model assigns more trials and more judges to each courtroom. CBO's simulations suggest that sharing would allow Denver's system to absorb a 25 percent increase in its caseload relative to the 1995 level with a small number of delays (see Table 2). (As a reference, data from the AOUSC show a recent boost in annual caseloads for federal courts averaging 2 percent a year.) Even with a 25 percent increase, courtroom use would rise to only 63.45 percent of available days; that is, courtrooms would still be unused for almost 40 percent of the available time. The percentage of trials that were delayed would increase to 3.96 percent, but the length of the delays would still be about half a day.

## APPENDIX: AN EXPLANATION OF CBO'S MODEL

The Congressional Budget Office (CBO) used General Purpose System Simulation software, which provides a simple framework for modeling queuing systems like that of the courts, featuring trials that wait for a courtroom.<sup>1</sup> The model creates a trial at intervals that it selects from a range determined in advance. It also randomly assigns trial lengths from a given distribution and then maps the flow of trials through the system, reporting delays and utilization rates. A delayed trial will be assigned a courtroom, the model assumes, on a first-in/first-out basis. Delays occur when scheduled trials are postponed because no courtroom is available; they are measured as the average number of days a trial is postponed. The model does not compute possible gains for the courtroom system if courtroom sharing and better use of space enables the judiciary to schedule trials sooner than it would have otherwise.

CBO derived the information on the intervals and the length of trials from data collected by the General Accounting Office (GAO) for the 10 courtrooms of the federal district court system in Denver, Colorado, in 1995. On the basis of an analysis of GAO's data, CBO determined that a beta distribution best characterized actual trial intervals. Similarly, CBO used a gamma distribution to characterize trial lengths. (Cities other than Denver may show different distributions.) In the absence of data linking trial-related activity to specific trials, CBO assumed that trial-related activity (such as pretrial conferences) was the same for all trials.

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1. The software is from Wolverine Software Corporation of Annandale, Virginia.

The model assumed that courtrooms were empty when the simulation began and then worked through its calculations until the system reached a steady state. The model computed statistics on delays and utilization rates for that steady state; its results are averages over many simulations.

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